

Evidence of the Formation of Large-Scale Current Sheets

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I will present X-ray evidence for the formation of large-scale current sheets in three flares observed by the RHESSI on 2002 April 14, 15, and 16.

I will focus on the event of 2002 April 15. The flare occurred on the northwest limb, showing a cusp-shaped flare loop in the rise phase. When the impulsive rise in hard X-rays (>25 keV) began, the cusp part of the coronal source separated from the underlying flare loop and remained stationary for about 2 minutes. During this time the underlying flare loops shrank at 9 km/s. The temperature of the underlying loops increased towards higher altitudes, while the temperature of the coronal source increased towards lower altitudes. These results indicate that a current sheet formed between the top of the flare loops and the coronal source during the early impulsive phase. After the hard X-ray peak, the flare loops grew outward at 8 km/s, and the coronal source moved outward at 300 km/s, indicating an upward expansion of the current sheet.